



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/576,564	04/18/2006	Yongdong Wang	CE-003PCT-US	4126
7590 David Aker 23 Southern Road Hartsdale, NY 10530		01/09/2008	EXAMINER LE, JOHN H	
			ART UNIT 2863	PAPER NUMBER
			MAIL DATE 01/09/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/576,564	WANG ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	John H. Le	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 29 October 2007.
- 2a) This action is **FINAL**.                            2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-27, 110, 112 and 114-116 is/are pending in the application.
- 4a) Of the above claim(s) 28-109, 111 and 113 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1, 2, 4, 18, 21-25, 27, 110, 112 and 114-116 is/are rejected.
- 7) Claim(s) 3, 5-17, 19, 20 and 26 is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 18 April 2006 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) Notice of Informal Patent Application
- 6) Other: \_\_\_\_\_

***Election/Restrictions***

1. Applicant's election of Group I (Claims 1-27, 110, 112, and 114-116) in Paper mailed on 10/29/2007 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Claims 28-52, 111, 113 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a non-elected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper mailed on 10/29/2007.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-2, 4, 18, 21-25, 27, 110, 112, and 114-116 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hastings (USP 6,787,761) in view of Wang et al. (USP 6,138,082) and Axelsson (USP 6,745,133).

Regarding claims 1 and 22, over Hastings discloses a method for obtaining at least one calibration filter (modified filter) for a Mass Spectrometry (MS) instrument system (e.g. Col.4, lines 17-45, Col.5, lines 59-67), comprising

the step of: obtaining, for a given calibration ion with its isotopes (e.g. the ion is generated, selected, and detected, Col.5, lines 33-35); calculating, for the given calibration ion with its isotopes, relative isotope abundances and actual mass locations of isotopes corresponding thereto (e.g. Col.5, lines 27-35).

Hastings fails to teach measured isotope peak cluster data in a mass spectral range; specifying mass spectral target peak shape functions; performing convolution operations the calculated the mass spectral target peak shape functions to form calculated peak cluster data; and performing a deconvolution operation between the measured peak cluster data and the calculated peak cluster data after the convolution operations to obtain the at least one calibration filter for total filtering matrix.

Axelsson teaches measured isotope peak cluster data (e.g. Col.3, line 52-Col.4, line 22) in a mass spectral range (e.g. Col.6, lines 55-58, Col.10, lines 27-34).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include step of measured isotope peak cluster data in a mass spectral range as taught by Axelsson in the method of obtaining calibration filter for Mass Spectrometry (MS) instrument system of Hastings. The motivation for making this combination would be to ensure that the peaks of a mass spectrum obtained by mass spectrometry are identified for peaks analysis.

Wang et al. teach specifying mass spectral target peak shape functions (e.g. Col.6, lines 10-36, Col.7, lines 16-40, Col.8, lines 12-32); performing convolution operations the calculated the mass spectral target peak shape

functions to form calculated peak cluster data (e.g. Col.6, lines 11-46); and performing a deconvolution operation between the measured peak cluster data and the calculated peak cluster data after the convolution operations to obtain the at least one calibration filter for total filtering matrix (e.g. Col.6, lines 17-43).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include step of specifying mass spectral target peak shape functions; performing convolution operations the calculated the mass spectral target peak shape functions to form calculated peak cluster data; and performing a deconvolution operation between the measured peak cluster data and the calculated peak cluster data after the convolution operations to obtain the at least one calibration filter as taught by Wang et al. in the method of obtaining calibration filter for Mass Spectrometry (MS) instrument system of Hastings in view of Axelsson . The motivation for making this combination would be to ensure that a computer that is receptive of spectral data from the detector to generate and compare spectral information associated with the materials easily.

Regarding claim 2, Wang et al. teach any of said steps of performing convolution operations and performing a deconvolution operation employs at least one of (Col.5, lines 3-18) and a matrix multiplication (Col.6, lines 18-43).

claim 3, step of pre-aligning measured mass spectral isotope peaks based on a least squares fit between centroid masses of the calculated relative isotope abundances and those of the measured isotope peak clusters, in a pre-calibration step performed subsequent to said calculating step.

Regarding claim 4, Wang et al. teach performing pre-calibration instrument-dependant transformations on raw mass spectral data; and performing post-calibration instrument-dependent transformations on a calculated data set corresponding to a test sample (e.g. Col.7, lines 4-65).

Regarding claim 18, Wang et al. disclose the at least one calibration filter comprises at least two calibration filters, and said method further comprises the step of further interpolating between the at least two calibration filters to obtain at least one other calibration filter within a desired mass range (e.g. Fig.1, Col.4, lines 65-66).

Regarding claim 21, Wang et al. disclose introducing the calibration standard one of prior to and in real-time through at least one of continuous infusion and online mixing so as to acquire both calibration data and test data in a single experiment (e.g. Fig.3, Col.7, line 4-Col.8, line 11).

Regarding claim 23, Wang et al. disclose interpolating the raw mass spectral data onto a same mass axis as that required by the total filtering matrix (e.g. Fig.1, Figs.3-5, Col.7, line 41-Col.8, line 59).

Regarding claims 24-25, Wang et al. disclose interpolating the calibrated mass spectral data onto any desired mass axis different from that given by the total filtering matrix (e.g. Col.8, lines 12-59); applying a weighted regression operation (e.g. Col.6, lines 10-36) to the calibrated mass spectral data to obtain at least one of integrated peak areas, actual masses and other mass spectral peak data for the mass spectral peaks (e.g. Col.6, lines 10-36, Col.7, lines 16-40, Col.8, lines 12-32).

Regarding claim 27, Wang et al. disclose applying multivariate statistical analysis to the calibrated mass spectral data to at least one of quantify, identify, and classify test samples (e.g. Col.7, lines 4-14).

Regarding claims 110, 112, and 115-116, Hastings discloses for use in a mass spectrometer (48) having associated therewith a computer (42) for performing data analysis functions of data produced by the mass spectrometer, a computer readable medium having placed thereon computer readable program instructions for performing method (e.g. Fig.7, Col.8, lines 43-67).

Regarding claim 114, Hastings discloses said calibration filter, when applied to a mass spectrum, performs at least one of noise filtering (e.g. Col.4, lines 17-45, Col.5, lines 59-67).

#### ***Allowable Subject Matter***

5. Claims 3, 5-17, 19-20, and 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 3, none of the prior art of record teaches or suggests wherein the steps of pre-aligning mass spectral isotope peaks based on a least squares fit between centroid masses of the calculated relative isotope abundances and those of the measured isotope peak clusters, in a pre-calibration step performed subsequent to said calculating step. It is these limitations as they are claimed in the combination with other limitations of claim,

which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 5, none of the prior art of record teaches or suggests wherein said steps of performing pre-calibration instrument-dependent transformations and performing post-calibration instrument-dependent transformations involve respectively creating a pre-calibration banded diagonal matrix and a post-calibration banded diagonal matrix, each nonzero element along a banded diagonal of each of the respective matrices for respectively performing an interpolation function corresponding to the pre-calibration instrument-dependent transformations and the post-calibration instrument-dependent transformations, and said method further comprises the step of creating from the at least one calibration filter a calibration banded diagonal matrix for performing both peak shape and mass axis calibration. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 11, none of the prior art of record teaches or suggests wherein the steps of performing a pre-calibration mass spacing adjustment from a non-uniformly spaced mass acquisition interval to a uniformly spaced mass interval; and performing a post-calibration mass spacing adjustment from the uniformly spaced mass interval to a reporting interval. It is these limitations as they are claimed in the combination with other limitations of claim, which have

not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 19, none of the prior art of record teaches or suggests wherein the steps of collecting the at least two calibration filters as vectors in a matrix for decomposition; decomposing the matrix that includes the at least two calibration filters; interpolating between decomposed vectors of the matrix to obtain interpolated vectors; and reconstructing the at least one other calibration filter using the interpolated vectors. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 26, none of the prior art of record teaches or suggests wherein weights of the weighted regression operation are proportional to an inverse of mass spectral variances. It is these limitations as they are claimed in the combination with other limitations of claim, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

***Contact Information***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John H. Le whose telephone number is 571 272 2275. The examiner can normally be reached on 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow can be reached on 571 272 2269. The

fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John H. Le

Patent Examiner-Group 2863

January 7, 2008